Katadyn – Micro Water Bottle

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Device Information

The Katadyn Micro Water Bottle is a handheld sports type squeeze bottle. This device is a 0.62 L (21 oz.) plastic bottle containing a modular filter cartridge system consisting of a 0.3 micron pleated glass microfilter for bacteria and cyst reduction, and carbon filter for taste and odor control. This device is not designed for virus reduction. Normal use entails simply filling the bottle with the cleanest water available, opening the bite valve, and squeezing the bottle to process water. No wait time or conditioning steps are necessary prior to using the device beyond expelling a small amount of water before first use to remove carbon fines. The filters can be replaced as necessary and if desired the device can be upgraded to the Katadyn Exstream Water Bottle Purifier to enable reduction of bacteria, cysts, and viruses by purchasing different filter cartridges.

Effectiveness Against Microbial Pathogens

No results were received that tested the device against the U.S. Environmental Protection Agency (USEPA) Guide Standard and Protocol for Testing Microbiological Water Purifiers (reference 1). Independent laboratory results (reference 2) were reviewed that tested the device against an abbreviated version of the protocol found in reference 1, entailing less sampling events, and omitting virus challenge. Results indicated that this device is capable of reducing bacteria and cysts by the values stated below by means of size exclusion through the glass microfilter. This device was assigned one √ for bacteria and cyst reduction, indicating that based on treatment technology, the device should be able to meet the requirements of reference 1 for these pathogens (click here for rating explanation) (reference 3). The device is assigned one X for virus reduction since there is no reduction mechanism or manufacturer claim for reducing this pathogen. Testing indicated that this device is highly affected by turbidity and, therefore, underwent minimal pathogen challenging with the high turbidity waters required in reference 1.

Table. Expected Performance Against Microbial Pathogens.

Microbial Pathogen Type	Expected Disinfection Capability	Evaluation Rating	Primary Pathogen Reduction Mechanism
Bacteria	> 6-log	√	size exclusion
Viruses	not effective*	X	none
Giardia cysts	> 3-log	√	size exclusion
Cryptosporidium oocysts	> 3-log	√	size exclusion

* Additional treatment required.

Production Rate and Capacity

Inherent to the production rate and capacity of filtration devices is the quality of the raw water source. The manufacturer stated production capacity of the device is 100 L. As shown during independent laboratory pathogen reduction testing (reference 2), turbid water negatively affects production capacity. Due to clogging after processing less than 5 liters of the high turbidity water specified in reference 1, the testing was stopped, resulting in a total production capacity of about 62 L. The majority of this production capacity was tested with clear water. The capacity of this device will vary widely with raw water turbidity. Given the design, the actual production rate is dependent on the user. Testing of a similar device, the Katadyn Exstream Water Bottle Purifier, indicated a production rate of 0.125 L/min as a minimum acceptable rate. In the absence of data, that production rate will be assumed for this device.

Cleaning, Replacement, and End of Life Indicator

This device cannot be backwashed to remove sediment from the filter. When the device becomes unusable due to decreased production rate, the clogged filter must be replaced. The bottle is dishwasher safe or can be hand washed with mild detergent and clean water. For practical purposes, the filter cartridges are not cleanable. The device contains no end of life indicator short of filter clogging. Since the device works solely on size exclusion, as long as the device will process water, stated pathogen reductions should be valid.

Weight and Size

Micro device	200 grams
Size (height x diameter)	28 cm x 8 cm

Cost

Micro device	$30.00
Replacement filter cartridges (microfilter and carbon)	$20.00

Device Evaluation

No data was received that tested this device against the protocol of reference 1. Independent laboratory results (reference 2) indicate that this device is capable of reducing bacteria and cysts by > 6-log and > 3-log, respectively. Bacteria and cyst reduction are accomplished by the 0.3 µm microfilter, followed by a carbon filter for taste and odor reduction. This device is not designed for virus reduction and therefore requires additional treatment to reduce health risk due to viral contamination. This device, like all filters with small pore sizes, is highly affected by turbid (cloudy) waters. During testing, turbid water quickly clogged the filter, making the device inoperable. These results indicate that this device is not practical if highly turbid waters are expected. Since the device is not able to be backwashed to remove accumulated particulates, once clogged, the filters must be replaced. No wait time is required prior to water consumption. There is no indicator of process failure or end of device useful life except filter clogging. No information was received on the storage life or required storage conditions for this device.

Advantages

- Independent testing (reference 2) confirmed bacteria and cyst reduction of > 6-log and > 3-log, respectively.
- No wait time prior to water consumption.
- Simple and lightweight.

Disadvantages

- Device is not designed for virus reduction and, therefore, unable to meet the pathogen reduction requirements of the USEPA Guide Standard and Protocol for Testing Microbiological Water Purifiers (reference 1).
- No independent laboratory data to indicate bacteria and cyst reduction in accordance with reference 1.
- Additional treatment required.
- Independent tests (reference 2) indicate device is highly affected by turbid waters.
- Device unable to be backwashed.
- No real-time indicator of process failure.

COTS Purifiers – Army Study Program, Project No. 31-MA-03E0-05.

References

1. USEPA, 1989. Guide Standard and Protocol for Testing Microbiological Water Purifiers. *Federal Register*. 54:34067.

2. Independent laboratory results of tests showing bacteria and cyst reduction, 2005. Provided by Katadyn.

3. U.S. Army Center for Health Promotion and Preventive Medicine, 2005. *Technical Information Paper; Filtration in the Use of Individual Water Purification Devices,* Aberdeen Proving Ground, MD.